herein "Lal"); and Claim 14 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sugita in view of Hokkyo and Kanbe et al. (U.S. Patent No. 6,221,508 B1, herein "Kanbe").

Claims 4-9 are amended to correct minor informalities and to be consistent with independent Claim 1. No new matter has been added.

Applicant thanks the Examiner for the courtesy of an interview extended to Applicant's representative on April 24, 2003. During the interview, the differences between the present invention and the applied art were discussed. The Examiner indicated that it appears that the permalloy layers disclosed in Sugita do not have a maximum magnetic permeability enough to meet one of the features of independent Claim 1. Arguments presented during the interview are reiterated below.

In response to the rejection of Claims 3 and 10-12 under 35 U.S.C. § 112, second paragraph, these claims are amended in light of the comments noted in the outstanding Office Action and as shown in the marked-up copy. Additionally, these claims are amended to correct minor informalities and to better conform to standard U.S. claim drafting practice. No new matter has been added. Accordingly, it is respectfully requested that this rejection be withdrawn.

Claims 1-7 and 9-13 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sugita in view of Hokkyo and Michaelsen. That rejection is respectfully traversed.

Independent Claim 1 is amended to correct minor informalities and to more clearly recite features. No new matter has been added.

Independent Claim 1 is directed to a magnetic recording medium having a non-magnetic substrate, at least two soft magnetic layers divided by a separate layer therebetween, and at least one magnetic recording layer formed on the substrate via the at least two soft magnetic layers. A surface roughness of the magnetic recording medium is at

most 50Å and a product of a maximum permeability and a thickness of the at least two soft magnetic layers is at least 1,000,000 HÅ/m.

As disclosed in the specification at page 7, line 10, to page 8, line 13, the magnetic recording medium of Claim 1 achieves a surface roughness and improves a yoke effect that reduce a noise at a time of a recording/reproduction operation. Therefore, the reduced surface roughness and the improved yoke effect as recited in independent Claim 1 synergically reduce the noise at the time of the recording/reproduction operation in the magnetic recording medium.

The outstanding Office Action recognizes at page 4, item 9, that Sugita "does not teach a magnetic recording medium wherein the medium has a surface roughness Ra of < 50 angstroms." In addition, the outstanding Office Action evaluates at page 3, item 8, a product of a thickness and a maximum permeability of a permalloy soft magnetic layer in Sugita. More specifically, the outstanding Office Action relies on the Applicant's specification for a value of the maximum magnetic permeability of the Permalloy layers disclosed in Sugita.[2] However, as discussed during the interview, the specification does not disclose that a maximum magnetic permeability of 330 H/m characterizes the Permalloy layers used in Sugita, as asserted in the outstanding Office Action.

In addition, the specification states "in a case where Permalloy or the like is employed for the soft magnetic layer, it has been necessary to make the soft magnetic layer as thick as at least 5,000 Å," which is in disagreement with the value of 3200 Å used in the outstanding Office Action for the soft magnetic layer. Thus, the use of Permalloy layers in Sugita do not meet the claimed requirements for maximum permeability.

[2] Outstanding Office Action, page 4, lines 12-16.

The outstanding Office Action relies on Hokkyo for teaching a ***magnetic layer*** having a roughness surface of at most 50 Å. However, as discussed during the interview, Hokkyo does not teach or suggest a ***magnetic medium*** having a surface roughness at most 50 Å.

In addition, Applicant submits experimental results (see Appendix A) showing in Examples 2 and 3 that a surface roughness degrades when thick layers as those in Hokkyo are used. However, the surface roughness improves when a structure as recited in the pending claims is used (see Examples 2, 4, and 5 in Appendix A).

Further, Michaelsen is asserted for teachings disclosed in the dependent claims. However, Michaelsen does not cure the deficiencies above-noted regarding Claim 1.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over the applied art.

Claim 8 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sugita in view of Hokkyo and Lal. That rejection is respectfully traversed.

Lal does not cure the deficiencies above-discussed regarding independent Claim 1. Because Claim 8 depends on independent Claim 1, which is believed to be allowable, it is respectfully submitted that Claim 8 patentably distinguishes over the applied art.

Claim 14 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sugita in view of Hokkyo and Kanbe. That rejection is respectfully traversed.

The outstanding Office Action relies on Kanbe for teaching a magnetic recording apparatus. However, Kanbe does not cure the deficiencies noted above regarding independent Claim 1. Because Claim 14 depends on independent Claim 1, which is believed to be allowable, it is respectfully submitted that Claim 14 patentably distinguishes over the applied art.

Since the present amendment raises no new issues, entry of this amendment under 37 C.F.R. § 1.116 is believed to be in order and it is therefore respectfully requested.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

Please amend the claims as follows:

--1. (Twice Amended) A magnetic recording medium comprising:

a non-magnetic substrate;

at least two soft magnetic layers divided by a separate layer therebetween; and

at least one magnetic recording layer formed on the substrate via said at least two soft magnetic layers [divided by a separate layer therebetween],

wherein [the] a surface roughness (Ra) of the magnetic recording medium is at most 50Å, and [the] a product (μmax × t) of [the] a maximum permeability (μmax) and [the] a thickness (t) of the [soft magnetic layer] at least two soft magnetic layers is at least 1,000,000 (H·Å/m).

3. (Amended) The magnetic recording medium according to Claim 1, further comprising a plurality of soft magnetic layers, said plurality of soft magnetic layers having [which has] from 2 to 20 soft magnetic layers, and a separate layer is provided between [the adjacent] any two soft magnetic layers.

4. (Amended) The magnetic recording medium according to Claim [2] 1, wherein the total thickness of the [plurality of] at least two soft magnetic layers and the separate [layers] layer is from 500 to 10,000 Å.

5. (Amended) The magnetic recording medium according to Claim [2] 1, wherein the ratio of the total thickness of the [plurality of] at least two soft magnetic layers and the

separate [layers] layer to the thickness of the separate [layers] layer, is from 1:0.05 to 1:0.5.

6. (Amended) The magnetic recording medium according to Claim [2] 1, wherein the ratio of the total thickness of the [plurality of] at least two soft magnetic layers and the separate [layers] layer to the thickness of the separate [layers] layer, is from 1:0.07 to 1:0.2.

7. (Amended) The magnetic recording medium according to Claim [2] 1, wherein the separate [layers is] layer is a non-magnetic [layers] layer.

8. (Amended) The magnetic recording medium according to Claim [2] 1, wherein the separate [layers are] layer is Cr or an alloy containing Cr as the main component.

9. (Amended) The magnetic recording medium according to Claim [2] 1, wherein [the] a thickness of the separate [layers] layer is from 50 to 300 Å.

10. (Amended) The magnetic recording medium according to Claim 1, wherein [the] a maximum permeability of the [soft magnetic layer] at least two soft magnetic layers is from 10 to 1,000,000 H/m.

11. (Amended) The magnetic recording medium according to Claim 1, wherein [the] a coercive force of the [soft magnetic layer] at least two soft magnetic layers is at most 100 Oersted.

12. (Amended) The magnetic recording medium according to Claim 1, wherein the [soft magnetic layer is] at least two soft magnetic layers are made of a NiFe alloy or a NiFeMo alloy.

14. (Amended) A magnetic recording apparatus comprising:

a magnetic recording medium[,];

[a] driving means to drive the magnetic recording medium in a recording direction[,]; and

a magnetic head provided with a recording section and a reproducing section, [a] means to relatively move the magnetic head against the magnetic recording medium, and [a]

recording/reproducing signal treating means to input recording signals to the magnetic head and to output reproducing signals from the magnetic head,

wherein the magnetic recording medium is a magnetic recording medium as defined in Claim 1.--

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APPENDIX A

	Layered structure	Surface roughness
Example 1	Glass substrate	Ra = 4 Å
Example 2	Glass substrate/NiFe 500 nm	Ra = 12 Å
Example 3	Glass substrate/NiFe 500 nm/Cr 50 nm/NiFe 500 nm	Ra = 15 Å
Example 4	Glass substrate/NiFe 100 nm/Cr 10 nm/NiFe 100 nm/Cr 10nm/.../NiFe 100 nm (5 NiFe layers are laminated)	Ra = 8 Å
Example 5	Glass substrate/NiFe 50 nm/Cr 5 nm/NiFe 50 nm/Cr 5 nm/.../NiFe 50 nm (10 NiFe layers are laminated)	Ra = 6 Å